IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

Kindt et al.

Serial No.: 10/605,773 Group Art Unit: 3722

Filed: October 24, 2003 Examiner: Michael Talbot

For: ADAPTIVE ELECTROSTATIC PIN CHUCK

Commissioner for Patents
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APPELLANTS' APPEAL BRIEF

Sirs:

Appellant respectfully appeals the final rejection of claims 1, 4-21, 24-35, and 37-40, in the Office Action dated October 6, 2005. A Notice of Appeal was timely filed on January 4, 2006.

I. REAL PARTY IN INTEREST

The real party in interest is International Business Machines Corp., Armonk, New York, assignee of 100% interest of the above-referenced patent application.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellants, Appellants' legal representative or Assignee which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1, 8, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by Van Os et al., hereinafter "Van Os" (5,708,556 in view of Guyot (5,885,423) and Di Milia et al. 4,551,192. Claims 5, 6, 11, and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Van Os, Guyot, Di Milia, further in view of Shiota (5,956,837). Claims 7 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Van Os. Claims 14-16, 18, 19, 21, 25, 26, 28-31, 33-35, 37, 39, and 40 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Van Os, Guyot, Di Milia, in view of Shiota and Lund. Claims 20 and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Van Os, Guyot, Di Milia, in view of Shiota, Lund, and Or. Claims 4, 17, and 38 stand rejected under 35 U.S.C. §102(b) as being anticipated by Van Os in view of Di Milia and Abdo et al., hereinafter "Abdo" (6,806,007).

IV. STATUS OF AMENDMENTS

An after-final Response that made no claim amendments was filed on November 30, 2005. An Advisory Action dated December 21, 2005 indicated that, upon filing an appeal, the Amendment filed on November 30, 2005 would be entered for the purposes of appeal, but did not place the application in condition for allowance, and that the rejections of claims would remain. The claims shown in the appendix are shown in their amended form as of the November 30, 2005 Amendment.

V. SUMMARY OF CLAIMED SUBJECT MATER

Paragraphs 13-16 of the specification and Figure 3 illustrates the claimed adaptive electrostatic contract that includes height adjustment mechanisms 32 that allow the individually adjustable pins 21 to be individually adjusted upward or downward to accommodate for foreign matter particles 13, that in turn allows the item being held in place by the chuck to remain completely flat. These features are defined in the various independent claims in different scopes.

Thus, for example, independent claim 1 defines, with respect to height adjustment mechanisms 32, that the " height adjustment mechanisms are adapted to individually adjust positions of said electrostatic chuck pins to compensate for flatness deformities in a device being held by said electrostatic chuck pins" and similarly independent claims 4, 17, and 24 define that the "height adjustment mechanisms compensate for foreign matter particles between said electrostatic chuck pins and a device being held by said electrostatic chuck pins." With respect to the electrostatic pins 21, independent claim 8 defines the "electrostatic pins connected to said height adjustment mechanisms."

Figure 4 illustrates a system embodiment that includes a computer 41 and a measurement tool 40 and claims 14, 21, and 24 define that the computer is "adapted to adjust said flatness of said device by adjusting said height adjustment mechanisms based on feedback from said measurement tool." The methodology illustrated in the flowchart shown in Figure 5 is defined by independent claims 28 and 34 using the following language "adjusting the height of said electrostatic chuck pins to correct any flatness errors determined in said measuring." Also, independent claim 35 defines the method process of "individually adjusting the height of height adjustment mechanisms connected between said electrostatic chuck pins and a plate of said electrostatic chuck to correct any flatness errors."

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues presented for review are whether claims 1, 8, 9 and 10 are anticipated under 35 U.S.C. §102(b) by "Van Os" in view of Guyot and Di Milia; whether claims 5, 6, 11, and 12 are unpatentable under 35 U.S.C. §103(a) over Van Os, Guyot, and Di Milia in view of Shiota; whether claims 7 and 13 are unpatentable under 35 U.S.C. §103(a) over Van Os; whether claims 14-16, 18, 19, 21, 25, 26, 28-31, 33-35, 37, 39, and 40 are unpatentable under 35 U.S.C. §103(a) over Van Os, Guyot, and Di Milia in view of Shiota and Lund; whether claims 20 and 24 are unpatentable under 35 U.S.C. §103(a) over Van Os, Guyot, and Di Milia, in view of Shiota and Lund; and whether claims 4, 17, and 38 are unpatentable under 35 U.S.C. §102(b) over Van Os in view of Di Milia and Abdo.

VII. ARGUMENT

A. The Rejection Based on Van Os, Guyot and Di Milia

1. The Position in the Office Action

The Office Action states:

> Claims 1,8,9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Os et al. '556 in view of Guyot '423, further in view of Di Milia et al. '192. Van Os et al. '556 shows in Figures 4,8 and 9 an electrostatic chuck (10) having a base plate (18), a height adjustment mechanism (86) connected to base plate and chuck pins (88) connected to the height adjustment mechanism. Van Os et al. '556 further discloses in col. 7, lines 14-27 that the flatness (i.e. a substantially horizontal orientation) is controlled through synchronized movements of the height adjustment mechanism. Van Os et al. '556 lacks the height adjustment

mechanism individually controlling the height of the pins as well as the pins being electrostatic pins.

Guyot '423 shows in Figure 2 a height adjustment mechanism (130) being capable of individually controlling each pin (col. 3, lines 42-55).

Di Milia et al. '192 shows in Figure 3 an electrostatic pin chuck (12) having pins (30) that are electrostatic due to the silicon dioxide film coating of the pins. Furthermore the Abstract, lines 13-17, provides additional support that the pins of the electrostatic chuck function as electrostatic pins.

In view of this teaching of Guyot '423, it is considered to have been obvious to replace the pin assembly of Van Os et al. '556 with another well-known, individually controlled pin assembly by Guyot '423 to eliminate the need for a separate platform for raising and lowering the pins thus making the design more compact and versatile to accommodate larger sized objects.

In view of this beaching of Di Milia et al. '192, it is considered to have been obvious to replace the pin assembly of Van Os et al. '556 with an electrostatic pin assembly by Di Milia et al. '192 to increase the versatility of the electrostatic pin chuck since it can now be used in vacuum environments (col. 6, lines 27-36) and to provide an improved holding force between the wafer the electrostatic pin chuck.

With regards to claim 1, it has been held that the recitation that an element is "adapted to" perform a function i; not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense.

2. Appellants' Position

a. Independent Claims 1 and 8

Appellants' respectfully submit that the proposed combination of Van Os, Guyot, and Di Milia does not teach or suggest electrostatic pins connected to height adjustment mechanisms (claims 1 and 8) or that the height of individual electrostatic pins can be adjusted to compensate for deformities (claim 1). Thus, as discussed in detail below, it is Appellants' position that independent claims 1 and 8 are patentable over the proposed combination of Van Os, Guyot, and Di Milia.

The Office Action proposes that it would have been obvious to substitute the cable-controlled, synchronized lifting pins 140 of Guyot for the lifting pins 88 in Van Os that are all fixed to the yoke member 92. The Office Action also proposes that it would have been obvious to substitute the electrostatic pins 30 of Di Milia for the lifting pins 88 in Van Os. However, this rejection is defective for failing set forth a prima facie case of obviousness because the Office Action does not identify where the motivational teaching for these modifications of Van Os appear in the record. To the contrary, each proposed modification of Van Os is accompanied by vague unsupported reasoning including that the modifications would make "the design more compact and versatile" and that the modifications would "provide an improved holding force between the wafer and the electrostatic pin chuck." Therefore, Appellants respectfully submit that the rejection is defective on its face even before any consideration of the merits of such proposed modifications to Van Os.

Further, the proposed modification of Van Os that makes the lifting pins electrostatic in nature destroys the operability of the Van Os device and therefore would not have been considered by one ordinarily skilled in the art. More specifically, the function of the lifting pins 88 in Van Os is to separate the wafer from the electrostatic

chuck 20. If the lifting pins 88 are changed to electrostatic pins (e.g., the lifting pins become the electrostatic chuck) as proposed in the Office Action, there would be no mechanism to lift the wafer off the electrostatic chuck since the pins would then be the electrostatic chuck. In other words, the function of the lifting pins 88 is to lift the wafer off the electrostatic chuck. If the lifting pins become the electrostatic chuck, their function as lifting pins is destroyed. If a proposed modification to a reference destroys the function of that reference, this demonstrates that it would not have been obvious to one ordinarily skilled in the art to so modify the reference. Therefore, again, the rejection is defective because a prima facie case of obviousness has not been established.

Also, Van Os already contains an electrostatic chuck 20. As mentioned above, the Office Action proposes modifying the lifting pins 88 into an electrostatic chuck. However, making the lifting pins 88 also an electrostatic chuck would introduce a redundant and unnecessary electrostatic chuck into the structure. Appellants respectfully submit that one of the primary defects of the rejection is that lifting pins are fundamentally different structures than electrostatic chucks. The two devices have fundamentally different functions, the chuck grasps the wafer, while the lifting pins lift the wafer off the chuck. These functions are so fundamentally different that one item cannot be substituted for the other. Attempting to modify the lifting pins as is proposed in the Office Action so that they become electrostatic is an unreasonable modification of the reference which would not have been performed by one ordinarily skilled in the art.

During examination of the current claims, it is apparent that no prior art reference was found that included adjustment mechanisms connected to electrostatic chuck pins. Therefore, Appellants submit that the Examiner engaged in hindsight reasoning in proposing to modify the lifting pins 88 of Van Os into electrostatic chuck pins. Such hindsight reasoning is impermissible and improper, and is additional support for Appellants' position that the rejection is defective and should be removed.

In column 7, lines 14-27, Van Os explains that the "lifting pins 88" are carried by a yoke member 92 and that the movement of the lifting pins is "synchronized with the

yoke member" indicating that all the lifting pins are moved together. In column 3, lines 43-59, Guyot explains that while independent cable and sleeve assemblies are utilized, such assemblies are utilized "to lift the pins 140 simultaneously"(column 3, line 55). Thus, while Guyot substitutes independent cable and sleeve assemblies for a common yoke member, such assemblies are not independently controlled, but instead are structured to operate synchronously to move the pins simultaneously.

Since both Van Os and Guyot explain that the movement of the lifting pins is "synchronized with the yoke member," (column 7, lines 15-27 of Van Os) and that the assemblies are utilized "to lift the pins 140 simultaneously" (column 3, lines 43-59 of Guyot) this indicates that all the lifting pins are moved together. To the contrary, with the claimed invention, the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins to compensate for flatness deformities in a device being held by said electrostatic chuck pins" (claim 1). Because the proposed combination of Van Os and Guyot connects the pins to a yoke or connects the pins to simultaneously controlled cable and sleeve assemblies, the pins must move together and cannot have independent movement, as is allowed in the claimed invention. Therefore, the proposed modification of Van Os using Guyot is further deficient in teaching that the pins are independently controlled and therefore cannot teach the invention defined by independent claim 1.

With respect to some functional limitations and elements that are "adapted to" perform a function, the Office Action concludes that these claim sections do "not constitute a limitation in any patentable sense." Such a statement is entirely incorrect and inconsistent with the MPEP. More specifically MPEP § 2173.05(g) states that a "functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which is used." Further, MPEP §2173.05(g) explains that terminology such as "adapted to" serves to precisely defines present "structural" attributes of interrelated component parts of the claimed assembly (In re Venezia, 530 F.2d 956, 189 USPQ 149

(CCPA 1976)). Therefore, the claimed "adapted to" limitations must be examined as being "structural" in nature and must be considered, just like any other limitation.

In view of the foregoing, it is Appellants' position that the proposed combination of Van Os, Guyot, and Di Milia does not teach or suggest "height adjustment mechanisms" with "electrostatic chuck pins" (claim 1) or "electrostatic pins" (claim 8), or that the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins" (claim 1). Therefore, independent claims 1 and 8 are patentable over the proposed combination of Van Os, Guyot, and Di Milia.

In view the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

b. Dependent Claims 9 and 10

Further, dependent claims 9 and 10 are similarly patentable, not only because they depend from patentable independent claim 8, but also because of the additional features of the invention they define. More specifically, dependent claim 9 defines that the height adjustment mechanisms "individually control" the height of each electrostatic pin. Because the proposed combination of Van Os, Guyot, and Di Milia, connects the pins to a yoke, commonly controlled cables, or lifting stand, the pins must move together and cannot have independent movement, as is allowed in the claimed invention defined by dependent claims 9. With respect to dependent claim 10 that defines that the adjustment mechanisms control the flatness of a device being held by the pins, because the proposed combination of Van Os, Guyot, and Di Milia connects the pins to a yoke, commonly controlled cables, or a lifting stand, the pins must move together and cannot have independent movement and therefore the proposed combination cannot control the flatness of the device being held, as is allowed in the claimed invention.

In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

B. The Rejection Based on Van Os, Guyot and Di Milia

1. The Position in the Office Action

The Office Action states:

> Claims 5, 6, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192, further in view of Shiota et al. '837. Van Os et al. 556 in view of Guyot '423 in view of Di Milia et al. '192 lack the height adjustment mechanism comprising computer controlled devices that automatically maintains a flatness of an object held by the electrostatic chuck pins. Shiota et al. '837 shows in Figures 1 and 2 a height adjustment mechanism (2) comprising computer controlled devices (40, 41, 62, 63, 64) that automatically maintain a flatness of an object (Figures 8A,8B and cot. 7, lines 38-65) held by the electrostatic chuck pins. In view of this teaching Shiota et al. '837, it is considered to have been obvious to modify the electrostatic chuck of Van Os et al. '556 in view of Guyot '423 in view 01 Di Milia et al. '192 to include computer controlled components disclosed by Shiota et al. '837 to provide enhanced control of the height adjustment mechanism and continuous monitoring capabilities of the objects outer surface characteristics.

2. Appellants' Position

a. Independent Claims 1 and 8

Dependent claims 5, 6, 11, and 12, as well as independent claims 1 and 8, are not taught or suggested by this proposed combination of references. Appellants' respectfully submit that the proposed combination of Van Os, Guyot, Di Milia, and Shiota does not teach or suggest electrostatic chuck pins connected to height adjustment mechanisms

(claims 1 and 8) or that the height of individual electrostatic pins can be adjusted to compensate for deformities (claim 1). Thus, as discussed in detail below, it is Appellants' position that independent claims 1 and 8 are patentable over the proposed combination of Van Os, Guyot, Di Milia, and Shiota.

As shown above, the proposed combination of Van Os, Guyot, and Di Milia does not teach or suggest "height adjustment mechanisms" with "electrostatic chuck pins" (claim 1) or "electrostatic pins" (claim 8), or that the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins" (claim 1). In column 3, lines 56-58, Shiota explains that the "lifting pins 5" are supported by a lifting stand 51 which moves all of the lifting pins 5 simultaneously. Therefore, in Shiota the lifting pins 5 are structured to operate synchronously to move the pins simultaneously in a very similar manner to Van Os and Guyot.

Since Van Os, Guyot, and Shiota all explain that the movement of the lifting pins is "synchronized with the yoke member," (column 7, lines 15-27 of Van Os), that the assemblies are utilized "to lift the pins 140 simultaneously" (column 3, lines 43-59 of Guyot), and that the lifting stand 51 supports the lifting pins 5 (column 3, line 54-column 4, line 4 of Shiota) this indicates that all the lifting pins are moved together. To the contrary, with the claimed invention, the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins to compensate for flatness deformities in a device being held by said electrostatic chuck pins" (claim 1). Because the proposed combination of Van Os, Guyot, and Shiota connects the pins to a yoke, commonly controlled cables, or a lifting stand, the pins must move together and cannot have independent movement, as is allowed in the claimed invention. Therefore, the proposed combination of Van Os, Guyot, Di Milia, and Shiota is further deficient in teaching that the pins are independently controlled and therefore cannot teach the invention defined by independent claim 1.

In view of the foregoing, it is Appellants' position that the proposed combination of Van Os, Guyot, Di Milia, and Shiota does not teach or suggest "height adjustment

mechanisms" with "electrostatic chuck pins" (claim 1) or "electrostatic pins" (claim 8), or that the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins" (claim 1). Therefore, independent claims 1 and 8 are patentable over the proposed combination of Van Os, Guyot, Di Milia, and Shiota. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

b. Dependent Claims 5, 6, 11, and 12

Further, dependent claims 5, 6, 11, and 12 are similarly patentable, not only because they depend from patentable independent claims 1 and 8, but also because of the additional features of the invention they define. For example, dependent claims 5 and 11 define that the height adjustment mechanisms comprise computer-control devices. Similarly, dependent claims 6 and 12 define that such devices automatically maintain a flatness of a device being held. Shiota explains that the "lifting pins 5" are supported by a lifting stand 51 which moves all of the lifting pins 5 simultaneously. Therefore, in Shiota the lifting pins 5 are structured to operate synchronously to move the pins simultaneously in a very similar manner to Van Os and Guyot. Since Van Os, Guyot, and Shiota all explain that the movement of the lifting pins is "synchronized with the yoke member," (column 7, lines 15-27 of Van Os), that the assemblies are utilized "to lift the pins 140 simultaneously" (column 3, lines 43-59 of Guyot), and that the lifting stand 51 supports the lifting pins 5 (column 3, line 54-column 4, line 4 of Shiota) this indicates that all the lifting pins are moved together which would not teach or suggest that the height adjustment mechanisms should be computer-controlled (claims 5 and 11) or the devices automatically maintain flatness, as defined by claims 6 and 12. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

C. The Rejection Based on Van Os, Guyot and Di Milia and Or

1. The Position in the Office Action

The Office Action states:

> Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192, further in view of Or et al. 2004/0045509. Van Os; et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 lack the height adjustment mechanism being one of screw type mechanisms piezoelectric actuators, hydraulic actuators, hydraulic pistons, thermal actuators and magnetic actuators. Or et al. 2004/0045509 shows on page 1, paragraph [0014J that the height adjustment mechanism (116) may be a pneumatic cylinder, hydraulic cylinder, lead screw, solenoid, stepper motor or other motion devices. In view of this teaching Or et al. 2004/0045509, it is considered to have been obvious to replace the pneumatic cylinder height adjustment mechanism of Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 with another well-known motion device disclosed by Or et al. 2004/0045509, such as a hydraulic cylinder or lead screw to achieve the desired movement.

2. Appellants' Position

a. Independent Claims 1 and 8

Dependent claims 7 and 13, as well as independent claims 1 and 8, are not taught or suggested by this proposed combination of references. Appellants' respectfully submit that the proposed combination of Van Os, Guyot, Di Milia, and Or does not teach or suggest electrostatic chuck pins connected to height adjustment mechanisms (claims 1

and 8) or that the height of individual electrostatic pins can be adjusted to compensate for deformities (claim 1). Thus, as discussed in detail below, it is Appellants' position that independent claims 1 and 8 are patentable over the proposed combination of Van Os, Guyot, Di Milia, and Or.

As shown above, Van Os, Guyot, and Di Milia does not teach or suggest "height adjustment mechanisms" with "electrostatic chuck pins" (claim 1) or "electrostatic pins" (claim 8), or that the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins" (claim 1). In paragraph 14, Or explains that the "lift pins 120" are supported by a lift plate 124 which moves all of the lift pins 120 simultaneously. Therefore, in Or, the lift pins 120 are structured to operate synchronously to move the pins simultaneously.

Since Van Os, Guyot, and Or all explain that the movement of the lifting pins is "synchronized with the yoke member," (column 7, lines 15-27 of Van Os), that the assemblies are utilized "to lift the pins 140 simultaneously" (column 3, lines 43-59 of Guyot), and that the lift plate 124 moves all of the lift pins 120 simultaneously (paragraph 14 of Or) this indicates that all the lifting pins are moved together. To the contrary, with the claimed invention, the "height adjustment mechanisms individually adjust positions of said electrostatic chuck pins to compensate for flatness deformities in a device being held by said electrostatic chuck pins" (claim 1). Because the proposed combination of Van Os, Guyot, and Or connects the pins to a yoke, commonly controlled cables, or a lift plate, the pins must move together and cannot have independent movement, as is allowed in the claimed invention. Therefore, the proposed combination of Van Os, Guyot, Di Milia, and Or is further deficient in teaching that the pins are independently controlled and therefore cannot teach the invention defined by independent claim 1.

In view of the foregoing, it is Appellants' position that the proposed combination of Van Os, Guyot, Di Milia, and Or does not teach or suggest "height adjustment mechanisms" with "electrostatic chuck pins" (claim 1) or "electrostatic pins" (claim 8), or that the "height adjustment mechanisms individually adjust positions of said electrostatic

chuck pins" (claim 1). Therefore, independent claims 1 and 8 are patentable over the proposed combination of Van Os, Guyot, Di Milia, and Or. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

b. Dependent Claims 7 and 13

Further, dependent claims 7 and 13 are similarly patentable, not only because they depend from patentable independent claims 1 and 8, but also because of the additional features of the invention they define. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

D. The Rejection Based on Van Os, Guyot, Di Milia, Shiota, and Lund

1. The Position in the Office Action

The Office Action states:

> Claims 14-16,18,19, 21, 25, 26, 28, 31, 33, 35, 37, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 in view of Shiota et al. '837, further in view of Lund '044. Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 in view of Shiota et al. '837, further in view of Lund '044 lack the computer being linked to a height adjustment mechanism and a measurement tool for adjusting the flatness of the object through the height adjustment mechanism based upon feedback data from the measurement tool to the computer. Lund '044 shows in Figures 10-13 a computer (60) for receiving the real-time data from a measurement tool (101), such as an interferometer to monitor any number of desired

> parameters, such as flatness. In view of this teaching Lund '044, it is considered to have been obvious to replace the computer controlled height adjustment mechanism for the electrostatic chuck of Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 in view of Shiota et al. '837, further in view of Lund '044 to include another well-known computer controlled apparatus by Lund '044 for measuring a number of key parameter for improved quality control.
>
> With regards to claims 14 and 21, it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense.

2. Appellants' Position

a. Independent Claims 14, 21, 28, and 35

Independent claims 14, 21, 28, and 35 as well as dependent claims 16, 18, 19, 25, 26, 29, 31, 33, 35, 37, 39, and 40, are not taught or suggested by this proposed combination of references. Appellants' respectfully submit that the proposed combination of Van Os, Guyot, Di Milia, Shiota, and Lund does not teach or suggest that the pins can be individually controlled (claims 21 and 35) or that the pins are "electrostatic pins" and are connected to "height adjustment mechanisms" (claims 14, 21, 28, and 35). Thus, as discussed in detail below, it is Appellants' position that independent claims 14, 21, 28, and 35 are patentable over the proposed combination of Van Os, Guyot, Di Milia, Shiota, and Lund.

As shown above, the proposed combination of Van Os, Guyot, Di Milia, and Shiota does not teach or suggest that the pins can be individually controlled (claims 21 and 35) or that the pins are "electrostatic pins" and are connected to "height adjustment mechanisms" (claims 14, 21, 28, and 35). While Lund discloses a vacuum chuck 122

(column 5, line 13) Lund does not disclose any form of structure which would lift the vacuum chuck and is only referenced in the Office Action for the purposes of showing that a computer can monitor measurement tools.

Lund discloses a system for chemically and mechanically polishing a semiconductor wafer that determines the thickness of the wafer surface film during the polishing process with a real time measurement device, or by determining a work-performed factor and calculating an estimated film thickness from the work-performed factor, and does not disclose measuring the "flatness" of the device (Lund, Abstract). Nowhere does Lund suggest that features of the vacuum chuck 122 should be adjusted to control the flatness of the device being polished. Instead, Lund measures only the thickness of the surface of the device being polished. Lund does not measure flatness and Lund does not teach or suggest adjusting the chuck to control flatness. There is nothing in any of the references that would suggest using the computerized real time measurement in Lund as a way of adjusting features of an electrostatic chuck, much less a method/system that adjusts individual electrostatic pins in order to improve flatness of the device being held by the chuck. Instead, the most that Lund can teach is monitoring a surface thickness during a polishing process, which is not a claimed feature.

To the contrary, the claimed invention can "adjust said flatness of said device by adjusting said height adjustment mechanisms" (claim 14), "adjust said flatness of said device by individually adjusting said height adjustment mechanisms" (claim 21), provide a process of "adjusting the height of said electrostatic pins to correct any flatness errors" (claim 28) and of "individually adjusting the height of height adjustment mechanisms connected between said electrostatic chuck pins and a plate of said electrostatic chuck to correct any flatness errors" (claim 35). Because the proposed combination of Van Os, Guyot, Di Milia, and Shiota, connects the pins to a yoke, commonly controlled cables, or lifting stand, the pins must move together and cannot have independent movement, as is allowed in the claimed invention. Again, Lund discloses nothing about controlling electrostatic pins to control the flatness of a device. Therefore, the proposed combination

of Van Os, Guyot, Di Milia, Shiota, and Lund is further deficient in teaching that the pins are controlled to adjust flatness (claims 14, 21, 28, and 35) or that the pins are independently controlled (claims 21 and 35).

In view of the foregoing, it is Appellants' position that the proposed combination of Van Os, Shiota, and Lund does not teach or suggest "height adjustment mechanisms" with "electrostatic chuck pins" (claims 21 and 35) or "electrostatic pins" (claims 14 and 28), or that the invention can "adjust said flatness of said device by adjusting said height adjustment mechanisms" (claim 14), "adjust said flatness of said device by individually adjusting said height adjustment mechanisms" (claim 21), provide a process of "adjusting the height of said electrostatic pins to correct any flatness errors" (claim 28) and of "individually adjusting the height of height adjustment mechanisms connected between said electrostatic chuck pins and a plate of said electrostatic chuck to correct any flatness errors" (claim 35). Therefore, independent claims 14, 21, 28, and 35 are patentable over the proposed combination of Van Os, Guyot, Di Milia, Shiota, and Lund.

In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

b. Dependent Claims 16, 18, 19, 25, 26, 29, 31, 33, 35, 37, 39, and 40

Further, dependent claims 16, 18, 19, 25, 26, 29, 31, 33, 35, 37, 39, and 40 are similarly patentable, not only because they depend from patentable independent claims 14, 21, 28, and 35, but also because of the additional features of the invention they define.

For example, dependent claim 16 defines that the height adjustment mechanisms control the flatness of the device being held. Because the proposed combination of Van Os, Guyot, Di Milia, and Shiota, connects the pins to a yoke, commonly controlled cables, or lifting stand, the pins must move together and cannot have independent

movement, as is allowed in the claimed invention. Again, Lund discloses nothing about controlling electrostatic pins to control the flatness of a device. Therefore, the proposed combination of Van Os, Guyot, Di Milia, Shiota, and Lund is further deficient in teaching that the pins are controlled to adjust flatness.

Further, dependent claims 18, 25, 31, and 37 define computers used to control the flatness of the device. Because the proposed combination of Van Os, Guyot, Di Milia, and Shiota, connects the pins to a yoke, commonly controlled cables, or lifting stand, the pins must move together and cannot have independent movement, as is allowed in the claimed invention. Again, Lund discloses nothing about controlling electrostatic pins to control the flatness of a device. Therefore, the proposed combination of Van Os, Guyot, Di Milia, Shiota, and Lund is further deficient in teaching that the pins are controlled to adjust flatness or that the pins are independently controlled which would not teach or suggest that the height adjustment mechanisms should be computer-controlled (claims 18, 25, 31, and 37).

Dependent claim 19, 26, 33, and 39 define that the adjusting of the adjustment mechanisms change the shape of the device to conform to a pre-existing standard. Once again, because the prior art of record does not teach or suggest that the pins can be individually adjusted, it cannot teach or suggest that the adjustment of those pins individually allows the chuck to change the shape of device being held to a pre-existing standard.

In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

E. The Rejection Based on Van Os, Guyot and Di Milia, Shiota, Lund and Or

1. The Position in the Office Action

The Office Action states:

With regards to claims 14 and 21, it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense.

Claims 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 in view of Shiota et al. '837 in view of Lund '044, further in view of Or et al. 2004/0045509. Van Os et al. '556 in view of Guyot '423 in view of Di Milia et al. '192 in view of Shiota et al. '837 in view of Lund '044 lack the height adjustment mechanism being one of screw type mechanisms piezoelectric actuators, hydraulic actuators, hydraulic pistons, thermal actuators and magnetic actuators. Or et al. 2004/0045509 shows on page 1, paragraph [0014] that the height adjustment mechanism (116) may be a pneumatic cylinder, hydraulic cylinder, lead screw, solenoid, stepper motor or other motion devices. In view of this teaching Or et al. 2004/0045509, it is considered to have been obvious to replace the pneumatic cylinder height adjustment mechanism of Van Os et al. '556 in view of Guyot '423 in view of D: Milia et al. '192 in view of Shiota et al. '837 in view of Lund '044 with another well-known motion device disclosed by Or et al. 2004/0045509, such as a hydraulic cylinder or lead screw to achieve the desired movement.

2. Appellants' Position

a. Independent Claims 14, 21, and 24

Independent claims 14, 21, and 24 as well as dependent claim 20 are not taught or suggested by this proposed combination of references. Appellants' respectfully submit that the proposed combination of Van Os, Guyot, Di Milia, Shiota, Lund, and Or does not teach or suggest that the pins are "electrostatic pins" and are connected to "height

adjustment mechanisms" (claims 14, 21, and 24). Thus, as discussed in detail below, it is Appellants' position that independent claims 14, 21, and 24 (and dependent claim 20) are patentable over the proposed combination of Van Os, Guyot, Di Milia, Shiota, Lund, and Or.

As shown above, the proposed combination of Van Os, Guyot, Di Milia, Shiota, and Lund does not teach or suggest that the pins can be individually controlled (claim 21) or that the pins are "electrostatic pins" and are connected to "height adjustment mechanisms" (claims 14, 21, and 24). Or explains that the "lift pins 120" are supported by a lift plate 124 which moves all of the lift pins 120 simultaneously. Therefore, in Or the lift pins 120 are structured to operate synchronously to move the pins simultaneously.

To the contrary, the claimed invention can "adjust said flatness of said device by adjusting said height adjustment mechanisms" (claim 14) or "adjust said flatness of said device by individually adjusting said height adjustment mechanisms" (claim 21). Because the proposed combination of Van Os, Guyot, Shiota, and Or connect the pins to a yoke, commonly controlled cables, or lifting stand, lifting plate, etc., the pins must move together and cannot have independent movement, as is allowed in the claimed invention. Therefore, the proposed combination of Van Os, Guyot, Di Milia, Shiota, Lund, and Or is further deficient in teaching that the pins are controlled to adjust flatness (claims 14, 21, and 24) or that the pins are independently controlled (claims 21 and 35).

In view of the foregoing, it is Appellants' position that the proposed combination of Van Os, Guyot, Di Milia, Shiota, Lund, and Or does not teach or suggest "height adjustment mechanisms" with "electrostatic chuck pins" (claim 21) or "electrostatic pins" (claim 14), or that the invention can "adjust said flatness of said device by adjusting said height adjustment mechanisms" (claim 14), or "adjust said flatness of said device by individually adjusting said height adjustment mechanisms" (claim 21). Therefore, independent claims 14, 21, and 24 are patentable over the proposed combination of Van Os, Guyot, Di Milia, Shiota, Lund, and Or. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

b. Dependent Claim 20

Further, dependent claim 20 is similarly patentable, not only because it depends from patentable independent claim 14, but also because of the additional features of the invention it defines. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

F. The Rejection Based on Van Os, Di Milia, and Abdo

1. The Position in the Office Action

The Office Action states:

> Claims 4, 17 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Os et al. '556 in view of Di Milia et al. '192, further in view of Abdo et al. '007. Van Os et al. '556 shows in Figures 4, 8 and 9 an electrostatic chuck (10) having a base plate (18), a height adjustment mechanism (86) connected to base plate and chuck pins (88) connected to the height adjustment mechanism Van Os et al. '556 further discloses in col. 7, lines 14-27 that the flatness (i.e. a substantially horizontal orientation) is controlled through synchronized movements of the height adjustment mechanism. Van Os et al. '556 lacks the pins being electrostatic chuck and the height adjustment capable of compensating for foreign matter particles.
>
> Di Milia et al. '192 shows in Figure 3 an electrostatic pin chuck (12) having pins (30) that are electrostatic due to the silicon dioxide film coating of the pins. Furthermore the Abstract, lines 13-17, provides additional support that the pins of the electrostatic chuck function as electrostatic pins.

Abdo et al. '007 shows in Figure 11-14 an electrostatic pin chuck having pins (1304) that can be adjusted (col. 9, line 50 through col. 10, line 51) to compensate for foreign particles (1206).

In view of this teaching of Di Milia et al. '192, it is considered to have been obvious to replace the pin assembly of Van Os et al. '556 with an electrostatic pin assembly by Di Milia et al. '192 to increase the versatility of the electrostatic pin chuck since it can now be used in vacuum environments (cot. 6, lines 27-36) and to provide an improved holding force between the wafer the electrostatic pin chuck.

In view of this teaching of Abdo et al. '007, it is considered to have been obvious to replace the height adjustment mechanism of Van Os et al. '556 with an height adjustment mechanism of Abdo et al. '007 to eliminate the possibility of contaminants being wedged between the electrostatic pins thus eliminate warping of the wafer and ensuring a proper electrostatic holding force between the pins/chuck and the wafer.

With regards to claims 4,17 and 38, the phrase "compensate for foreign matter particles between said electrostatic chuck pins and a device being held by said electrostatic chuck pins" is merely functional/intended use not defining any specific structure and only requires prior art references to be capable of said intended use. See MPEP 2114. In this case, height adjustment device (18,86,88) of by Van Os et al. '556 is clearly capable of being adjusted due to foreign matter by controlling the flatness (i.e., a substantially horizontal orientation) through synchronized movements of the height adjustment mechanism (col. 7, lines 14-27.

2. Appellants' Position

a. Independent Claims 4, 17, and 35

Independent claims 4, 17, and 35 as well as dependent claim 38 are not taught or suggested by this proposed combination of references. Appellants' respectfully submit that the proposed combination of Van Os, Di Milia, and Abdo does not teach or suggest that the pins are "electrostatic pins" and are connected to "height adjustment mechanisms" (claims 4, 17, and 35). Thus, as discussed in detail below, it is Appellants' position that independent claims 4, 17, and 35 (and dependent claim 38) are patentable over the proposed combination of Van Os, Di Milia, and Abdo.

As shown above, the proposed combination of Van Os and Di Milia does not teach or suggest that the pins are "electrostatic pins" and are connected to "height adjustment mechanisms" (claims 4, 17, and 35). The Office Action proposes that Abdo discloses electrostatic chuck pins 1304 that can be adjusted. To the contrary, in a very similar manner to Van Os, items 1304 in Abdo are again merely "lift pins" that are part of a clamping plate 1306 (column 10, lines 5-25 of Abdo). There is nothing within Abdo which would teach or suggest to one ordinarily skilled in the art to modify the lift pins of Van Os into electrostatic pins.

In view of the foregoing, it is Appellants' position that the proposed combination of Van Os, Di Milia, and Abdo does not teach or suggest that the pins are "electrostatic pins" and are connected to "height adjustment mechanisms" (claims 4, 17, and 35). Thus, as discussed in detail below, it is Appellants' position that independent claims 4, 17, and 35 (and dependent claim 38) are patentable over the proposed combination of Van Os, Di Milia, and Abdo. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

b. Dependent Claim 38

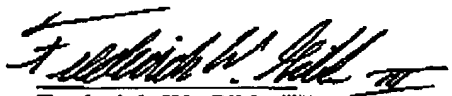
Further, dependent claim 38 is similarly patentable, not only because it depends from patentable independent claim 35, but also because of the additional features of the invention it defines. In view of the foregoing, the Board is respectfully requested to reconsider and withdraw this rejection.

VIII. CONCLUSION

In view the forgoing, the Board is respectfully requested to reconsider and withdraw the rejections of claims 1, 4-21, 24-35, and 37-40.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,



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VIII. CLAIMS APPENDIX

1. (Previously Presented) An electrostatic chuck comprising:

a base plate;

individually controlled height adjustment mechanisms connected to said base plate; and

electrostatic chuck pins connected to said height adjustment mechanisms,

wherein said height adjustment mechanisms are adapted to individually adjust positions of said electrostatic chuck pins to compensate for flatness deformities in a device being held by said electrostatic chuck pins.

2-3. (Canceled).

4. (Previously Presented) An electrostatic chuck comprising:

a base plate;

height adjustment mechanisms connected to said base plate; and

electrostatic chuck pins connected to said height adjustment mechanisms,

wherein said height adjustment mechanisms compensate for foreign matter particles between said electrostatic chuck pins and a device being held by said electrostatic chuck pins.

5. (Original) The electrostatic chuck in claim 1, wherein said height adjustment mechanisms comprise computer-controlled devices.

6. (Original) The electrostatic chuck in claim 1, wherein said height adjustment mechanisms comprise devices that automatically maintain a flatness of a device being held by said electrostatic chuck pins.

7. (Original) The electrostatic chuck in claim 1, wherein said height adjustment mechanisms comprise one of screw type mechanisms, piezoelectric actuators, hydraulic actuators, hydraulic pistons, thermal actuators, and magnetic actuators .

8. (Previously Presented) An electrostatic chuck comprising:
height adjustment mechanisms; and
electrostatic pins connected to said height adjustment mechanisms.

9. (Previously Presented) The electrostatic chuck in claim 8, wherein said height adjustment mechanisms individually control the height of each electrostatic pin.

10. (Previously Presented) The electrostatic chuck in claim 8, wherein said height adjustment mechanisms control the flatness of a device being held by said electrostatic pins.

11. (Original) The electrostatic chuck in claim 8, wherein said height adjustment mechanisms comprise computer-controlled devices.

12. (Previously Presented) The electrostatic chuck in claim 8, wherein said height adjustment mechanisms comprise devices that automatically maintain a flatness of a device being held by said electrostatic pins.

13. (Original) The electrostatic chuck in claim 8, wherein said height adjustment mechanisms comprise one of screw type mechanisms, hydraulic actuators, hydraulic pistons, piezoelectric actuators, magnetic actuators, and thermal actuators.

14. (Previously Presented) A system for maintaining a device flat on an electrostatic chuck, said system comprising:

an electrostatic chuck comprising height adjustment mechanisms and electrostatic pins connected to said height adjustment mechanisms;

a measurement tool adapted to measure the flatness of a device held by said electrostatic pins; and

a computer linked to said height adjustment mechanisms and said measurement tool, said computer being adapted to adjust said flatness of said device by adjusting said height adjustment mechanisms based on feedback from said measurement tool.

15. (Previously Presented) The system in claim 14, wherein said height adjustment mechanisms individually control the height of each electrostatic pin.

16. (Previously Presented) The system in claim 14, wherein said height adjustment mechanisms control the flatness of said device being held by said electrostatic pins.

17. (Previously Presented) A system for maintaining a device flat on an electrostatic chuck, said system comprising:

an electrostatic chuck comprising height adjustment mechanisms and pins connected to said height adjustment mechanisms;

a measurement tool adapted to measure the flatness of a device held by said pins; and

a computer linked to said height adjustment mechanisms and said measurement tool, said computer being adapted to adjust said flatness of said device by adjusting said height adjustment mechanisms based on feedback from said measurement tool,

wherein said height adjustment mechanisms compensate for foreign matter particles between said electrostatic chuck pins and said device being held by said electrostatic chuck pins.

18. (Original) The system in claim 14, wherein said height adjustment mechanisms comprise computer-controlled devices.

19. (Previously Presented) The system in claim 14, wherein said computer is adapted to change the shape of said device to conform to a pre-existing standard.

20. (Original) The system in claim 14, wherein said height adjustment mechanisms comprise one of screw type mechanisms, piezoelectric actuators, hydraulic actuators, hydraulic pistons, thermal actuators, and magnetic actuators.

21. (Previously Presented) A system for maintaining a device flat on an electrostatic chuck, said system comprising:

an electrostatic chuck comprising: a base plate; individually controlled height adjustment mechanisms connected to said base plate; and electrostatic chuck pins connected to said height adjustment mechanisms;

a measurement tool adapted to measure the flatness of a device held by said electrostatic chuck pins; and

a computer connected to said height adjustment mechanisms and said measurement tool, said computer being adapted to adjust said flatness of said device by individually adjusting said height adjustment mechanisms based on feedback from said measurement tool.

22-23. (Canceled).

24. (Previously Presented) A system for maintaining a device flat on an electrostatic chuck, said system comprising:

an electrostatic chuck comprising: a base plate; height adjustment mechanisms connected to said base plate; and electrostatic chuck pins connected to said height adjustment mechanisms;

a measurement tool adapted to measure the flatness of a device held by said electrostatic chuck pins; and

a computer connected to said height adjustment mechanisms and said measurement tool, said computer being adapted to adjust said flatness of said device by adjusting said height adjustment mechanisms based on feedback from said measurement tool,

wherein said height adjustment mechanisms compensate for foreign particles between said electrostatic chuck pins and a device being held by said electrostatic chuck pins.

25. (Original) The system in claim 21, wherein said height adjustment mechanisms comprise computer-controlled devices.

26. (Original) The system in claim 21, wherein said computer changes the shape of said device to conform to a pre-existing standard by adjusting individually said height adjustment mechanisms.

27. (Original) The system in claim 21, wherein said height adjustment mechanisms comprise one of screw type mechanisms, piezoelectric actuators, hydraulic actuators, hydraulic pistons, thermal actuators, and magnetic actuators .

28. (Previously Presented) A method of attaching a device to an electrostatic chuck, said method comprising:

attaching said device to electrostatic pins of said electrostatic chuck;

measuring a flatness of said device; and

adjusting the height of said electrostatic pins to correct any flatness errors determined in said measuring of said flatness of said device.

29. (Previously Presented) The method in claim 28, wherein said adjusting of said height of said electrostatic pins comprises adjusting height adjustment mechanisms connected between said electrostatic pins and a plate of said electrostatic chuck.

30. (Original) The method in claim 29, wherein said adjusting process adjusts each height adjustment mechanism individually.

31. (Original) The method in claim 28, wherein said adjusting process is performed using a computer connected to a measurement device and to height adjustment mechanisms.

32. (Previously Presented) The method in claim 28, wherein said adjusting process compensates for foreign matter particles between said electrostatic pins and said device being held by said electrostatic pins.

33. (Original) The method in claim 28, wherein said adjusting process changes the shape of said device to conform to a pre-existing standard.

34. (Previously Presented) A method of attaching a device to an electrostatic chuck, said method comprising:

attaching said device to electrostatic chuck pins of said electrostatic chuck;

measuring a flatness of said device; and

adjusting the height of said electrostatic chuck pins to correct any flatness errors determined in said measuring process,

wherein said measuring process is performed using an interferometer.

35. (Previously Presented) A method of attaching a device to an electrostatic chuck, said method comprising:

attaching said device to electrostatic chuck pins of said electrostatic chuck;

measuring a flatness of said device; and

individually adjusting the height of height adjustment mechanisms connected between said electrostatic chuck pins and a plate of said electrostatic chuck to correct any flatness errors determined in said measuring process.

36. (Canceled).

37. (Original) The method in claim 35, wherein said adjusting process is performed using a computer connected to a measurement device and to said height adjustment mechanisms.

38. (Original) The method in claim 35, wherein said adjusting process compensates for foreign matter particles between said electrostatic chuck pins and said device being held by said electrostatic chuck pins.

39. (Original) The method in claim 35, wherein said adjusting process changes the shape of said device to conform to a pre-existing standard.

40. (Original) The method in claim 35, wherein said measuring process is performed using an interferometer.

IX. EVIDENCE APPENDIX

There is no other evidence known to Appellants, Appellants' legal representative or Assignee which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

X. RELATED PROCEEDINGS APPENDIX

There is no other related proceedings known to Appellants, Appellants' legal representative or Assignee which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.